

CHAPTER 5

INSPECTION OF MILLED RICE

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5.1 DEFINITION OF MILLED RICE

WHOLE OR BROKEN KERNELS OF RICE (ORYZA SATIVA L.) FROM WHICH THE HULLS AND AT LEAST THE OUTER BRAN LAYERS HAVE BEEN REMOVED AND WHICH CONTAIN NOT MORE THAN 10.0 PERCENT OF SEEDS, PADDY KERNELS, OR FOREIGN MATERIAL, EITHER SINGLY OR COMBINED.

5.2 GRADES AND GRADE REQUIREMENTS

The grades and grade requirements for all classes of milled rice are shown in the United States Standards for Rice (Section 68.314), and in Attachment 2, “Grades and Grade Requirements for Milled Rice,” to this chapter.

5.3 SPECIAL GRADES AND SPECIAL GRADE REQUIREMENTS

A. The special grades and special grade requirements for all classes of milled rice are shown in the United States Standards for Rice (Section 868.315).

B. A special grade, when applicable, is supplemental to the grade assigned. Such special grades for milled rice are defined as follows:

1. Coated milled rice. Coated milled rice shall be rice which is coated, in whole or in part, with substances that are safe and suitable as defined in the regulations issued pursuant to the Federal Food, Drug, and Cosmetic Act as 21 CFR 130.3(d).

2. Granulated brewers milled rice. Granulated brewers milled rice shall be milled rice which has been crushed or granulated so that 95.0 percent or more will pass through a 5 sieve, 70.0 percent or more will pass through a 4 sieve, and not more than 15.0 percent will pass through a 2½ sieve.

3. Parboiled milled rice. Parboiled milled rice shall be milled rice in which the starch has been gelatinized by soaking, steaming, and drying. If the rice is:

a. Not distinctly colored by the parboiling process, the rice shall be considered “Parboiled Light;”

b. Distinctly but not materially colored by the parboiling process, the rice shall be considered “Parboiled;”

c. Materially colored by the parboiling process, the rice shall be considered “Parboiled Dark.”

4. Undermilled milled rice. Undermilled milled rice shall be milled rice which is not equal to the milling requirements for “well-milled,” “reasonably well milled,” and “lightly milled” rice.

5. Glutinous milled rice. Special varieties of rice which contain more than 50 percent of chalky kernels.

6. Aromatic milled rice. Special varieties of rice that have a distinctive and characteristic aroma; e.g., basmati and jasmine rice.

5.4 WORK RECORD

Record the results of all tests and findings clearly and accurately on a laboratory ticket or similar form. This will be used as the source of the information reported on the inspection certificate. FGIS personnel shall use form FGIS-911, “Rice Sample Ticket,” to record inspection results. Cooperator’s shall use a similar form.

NOTE: For submitted sample inspections, results may be recorded on a form FGIS-932, “Rice Inspection Certificate - Submitted Sample Inspection,” or similar form.

5.5 REPRESENTATIVE PORTION

A specified quantity of rice divided out from the representative sample by means of an FGIS-approved device.

5.6 WORK SAMPLE

A representative portion of rice (approximate size - 1,000 grams) that is used to make all such determinations required for a particular class of rice.

5.7 FILE SAMPLE

A. A representative portion of rice (approximate size - 1,000 grams) that may be used in conjunction with the work sample, when needed, to determine the complete grade. File samples may also be used for monitoring, retest, and appeal inspection purposes.

B. Retain file samples in appropriate containers for the required retention period. After maintaining for the required period, dispose of the file samples in accordance with established procedures. See FGIS Instruction 917-13, “Uniform File Sample Retention System for Rice, Pulses, and Processed Products Inspected Under AMA,” for additional information.

5.8 PERCENTAGES AND COUNTS

A. Percentages are determined upon the basis of weight and are rounded as follows:

1. When the figure to be rounded is followed by a figure greater than or equal to 5, round to the next higher figure; e.g., report 6.36 as 6.4, 0.35 as 0.4, and 2.45 as 2.5.
2. When the figure to be rounded is followed by a figure less than 5, retain the figure; e.g., report 8.34 as 8.3, and 1.22 as 1.2.

B. Record percentages as follows:

1. For broken kernels removed by a 5 plate in U.S. No. 1 and 2 milled rice and for objectionable seeds in U.S. No. 1 Brewers milled rice, to the nearest hundredth percent.
2. For all other factors, to the nearest tenth of percent.

C. Record counts, for all factors determined on the basis of count, to the nearest whole number.

5.9 LABORATORY SCALES

Weigh samples and portions of samples using the proper class of FGIS-approved laboratory scales, and record the results to the correct division size. Use the table below to determine the scale class and division size required for weighing particular sized samples.

<u>Table 1 - Laboratory Scales</u>			
Portion Size	Scale Class	Maximum Division Size	Record Results to at Least the Nearest --
120 grams or less	Precision	0.01 gram	0.01 gram
Samples for moisture determinations	Precision or Moisture	0.1 gram	0.1 gram
More than 120 grams	Precision, Moisture, or General	1 gram	1 gram
NOTE: See Chapter 2, Equipment Handbook, for additional information.			

5.10 PRELIMINARY EXAMINATION

A. The sampler must: (1) observe the uniformity of the rice as to type/class, quality, and condition; (2) make the determination for “Heating;” (3) draw the representative sample; and (4) report relevant information to the inspector.

B. The inspector must review the sampler’s remarks/information. If the inspector has questions or doubts the representativeness of the sample, he or she must contact the sampler and obtain the needed information or make arrangements to obtain another sample.

5.11 BASIS OF DETERMINATION

ALL DETERMINATIONS SHALL BE MADE ON THE BASIS OF THE ORIGINAL SAMPLE. MECHANICAL SIZING OF KERNELS SHALL BE ADJUSTED BY HAND PICKING, AS PRESCRIBED IN FGIS INSTRUCTIONS, OR BY ANY METHOD WHICH GIVES EQUIVALENT RESULTS.

BROKEN KERNELS SHALL BE DETERMINED BY THE USE OF EQUIPMENT AND PROCEDURES PRESCRIBED IN FGIS INSTRUCTIONS, OR BY ANY METHOD WHICH GIVES EQUIVALENT RESULTS.

NOTE 1: When rice that is offered for inspection as one lot is found to contain more than 10,000 containers or 1,000,000 pounds (bulk) of rice, the lot must be sampled on the basis of two or more (approximately) equal-sized sublots of 10,000 containers or 1,000,000 pounds or less. Inspect each subplot separately. (For additional information, see Chapter 7, “Roundlot Inspection Plan” and Chapter 8, “Warehouse-Lot Inspection Plan.”)

NOTE 2: When rice that is offered for inspection as one lot is subsequently found to contain portions that are distinctly different in class/type, quality, or condition, the rice in each portion shall be inspected separately.

A. Follow a systematic grading procedure. The order of procedure varies with the class and quality of the rice and the tests that are required to determine the grade. A general order of procedure is as follows:

1. Review information on the sample ticket.
2. Examine the representative sample for odor and distinctly low quality.
3. Use an FGIS-approved divider to process the representative sample into three representative portions: (a) a work sample, (b) a file sample, and (c) a moisture portion.

NOTE: For specific information on the operation and maintenance of dividers, see Chapter 3 of the Equipment Handbook.

4. Examine the work sample for test weight (if requested) and type.
5. Reduce the 1,000-gram work sample to approximately 500 grams and examine the portion for:
 - Infestation
 - Paddy kernels (all classes except BMR)
 - Seeds (all classes except BMR)
 - Heat-damaged kernels (all classes except SMR and BMR)
6. Reduce the 500-gram portion to approximately 250 grams and examine the portion for:
 - Milling (degree) requirements
 - Color
7. Divide out from the 250-gram portion a 100-gram portion and a 50-gram portion.
8. Examine the 100-gram portion for foreign material (all classes except BMR).
9. Examine the 50-gram portion for:
 - Broken kernels removed by a 5 plate and a 6 plate, or that pass through a 6 sieve.
 - Class (for SHMR, SMR, and BMR)
 - 30 sieve material
10. Reduce the 50-gram portion to approximately 25 grams and examine the portion for:
 - Broken kernels total
 - Chalky kernels
 - Class (whole kernels for LGMR, MGMR, and SHGMR)
 - Foreign material (for BMR)
 - Heat-damaged kernels, kernels damaged by heat, and/or parboiled kernels in nonparboiled rice (for SMR and BMR).
 - Other types (whole kernels, and whole and broken kernels)
 - Red rice and damaged kernels
 - Seeds (for BMR)
 - Ungelatinized kernels
 - Well-milled kernels

B. When the grade (or contract compliance) of a lot or sample is determined by a narrow margin (± 0.1 % or 1 count) on a single factor, another determination shall be made on another representative portion of equivalent size divided out from the work sample or file sample. The factor result shall be based on the average of the two determinations.

5.12 MOISTURE

MOISTURE. WATER CONTENT IN MILLED RICE AS DETERMINED BY AN APPROVED DEVICE IN ACCORDANCE WITH PROCEDURES PRESCRIBED IN FGIS INSTRUCTIONS, FOR THE PURPOSE OF THIS PARAGRAPH, “APPROVED DEVICE” SHALL INCLUDE THE MOTOMCO MOISTURE METER AND ANY OTHER EQUIPMENT THAT IS APPROVED BY THE ADMINISTRATOR AS GIVING EQUIVALENT RESULTS.

- A. Determine moisture on a representative portion of exactly 250 grams.
- B. Refer to Chapter 5 of the Moisture Handbook for information about determining moisture using the Motomco Moisture Meter.
- C. Record the percent of moisture on the work record and the certificate to the nearest tenth percent. If the moisture content exceeds 15.0 percent, grade the rice “U.S. Sample grade.”

5.13 TYPE

THERE ARE THREE TYPES OF MILLED RICE AS FOLLOWS: LONG GRAIN, MEDIUM GRAIN, AND SHORT GRAIN.

TYPE SHALL BE BASED ON THE LENGTH-WIDTH RATIO OF KERNELS OF RICE THAT ARE UNBROKEN AND THE WIDTH, THICKNESS, AND SHAPE OF KERNELS OF RICE THAT ARE BROKEN AS PRESCRIBED IN FGIS INSTRUCTIONS.

- A. The length-width ratio limitations for milled rice are:

<u>Long grain</u>	<u>Medium grain</u>	<u>Short grain</u>
3.0 (or more) to 1	2.0 - 2.9 to 1	1.9 (or less) to 1

- B. Type is usually determined by a cursory examination of the work sample as a whole.
- C. When a detailed examination is necessary, determine type by measuring the length and width of 15 unbroken kernels taken at random from the work sample and determining their average length-width ratio.
 - 1. Length is the distance between the most distant tips of the kernel.
 - 2. Width is the distance across the kernel at the widest point.

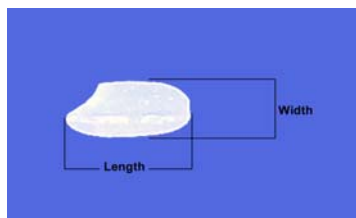


Figure 1. Measuring Milled Rice Kernels

5.14 CLASS

THERE ARE SEVEN CLASSES OF MILLED RICE. THE FOLLOWING FOUR CLASSES SHALL BE BASED ON THE PERCENTAGE OF WHOLE KERNELS AND TYPE OF RICE: LONG GRAIN MILLED RICE, MEDIUM GRAIN MILLED RICE, SHORT GRAIN MILLED RICE, MIXED MILLED RICE.

“LONG GRAIN MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH CONTAINS MORE THAN 25.0 PERCENT OF WHOLE KERNELS OF MILLED RICE AND IN U.S. NOS. 1 THROUGH 4 NOT MORE THAN 10.0 PERCENT OF WHOLE OR BROKEN KERNELS OF MEDIUM OR SHORT GRAIN RICE. U.S. No. 5 AND U.S. No. 6 LONG GRAIN MILLED RICE SHALL CONTAIN NOT MORE THAN 10.0 PERCENT OF WHOLE KERNELS OF MEDIUM OR SHORT GRAIN RICE (BROKEN KERNELS DO NOT APPLY).

“MEDIUM GRAIN MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH CONTAINS MORE THAN 25.0 PERCENT OF WHOLE KERNELS OF MILLED RICE AND IN U.S. NOS. 1 THROUGH 4 NOT MORE THAN 10.0 PERCENT OF WHOLE OR BROKEN KERNELS OF LONG GRAIN RICE OR WHOLE KERNELS OF SHORT GRAIN RICE. U.S. No. 5 AND U.S. No. 6 MEDIUM GRAIN MILLED RICE SHALL CONTAIN NOT MORE THAN 10.0 PERCENT OF WHOLE KERNELS OF LONG OR SHORT GRAIN MILLED RICE (BROKEN KERNELS DO NOT APPLY).

“SHORT GRAIN MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH CONTAINS MORE THAN 25.0 PERCENT OF WHOLE KERNELS OF MILLED RICE AND IN U.S. NOS. 1 THROUGH 4 NOT MORE THAN 10.0 PERCENT OF WHOLE OR BROKEN KERNELS OF LONG GRAIN RICE OR WHOLE KERNELS OF MEDIUM GRAIN RICE. U.S. No. 5 AND U.S. No. 6 SHORT GRAIN MILLED RICE SHALL CONTAIN NOT MORE THAN 10.0 PERCENT OF WHOLE KERNELS OF LONG OR MEDIUM GRAIN MILLED RICE (BROKEN KERNELS DO NOT APPLY).

“MIXED MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH CONTAINS MORE THAN 25.0 PERCENT OF WHOLE KERNELS OF MILLED RICE AND MORE THAN 10.0 PERCENT OF “OTHER TYPES” AS DEFINED IN PARAGRAPH (1) OF THIS SECTION. U.S. No. 5 AND U.S. No. 6 MIXED MILLED RICE SHALL CONTAIN MORE THAN 10.0 PERCENT OF WHOLE KERNELS OF “OTHER TYPES” (BROKEN KERNELS DO NOT APPLY).

THE FOLLOWING THREE CLASSES SHALL BE BASED ON THE PERCENTAGE OF WHOLE KERNELS AND OF BROKEN KERNELS OF DIFFERENT SIZE: SECOND HEAD MILLED RICE, SCREENINGS MILLED RICE, BREWERS MILLED RICE.

“SECOND HEAD MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH, WHEN DETERMINED IN ACCORDANCE WITH SECTION 868.303, CONTAINS: (1) NOT MORE THAN; (A) 25.0 PERCENT OF WHOLE KERNELS, (B) 7.0 PERCENT OF BROKEN KERNELS REMOVED BY A 6 PLATE, (C) 0.4 PERCENT OF BROKEN KERNELS REMOVED BY A 5 PLATE, AND (D) 0.05 PERCENT OF BROKEN KERNELS PASSING THROUGH A 4 SIEVE (SOUTHERN PRODUCTION); OR (2) NOT MORE THAN; (A) 25.0 PERCENT OF WHOLE KERNELS, (B) 50.0 PERCENT OF BROKEN KERNELS PASSING THROUGH A 6½ SIEVE, AND (C) 10.0 PERCENT OF BROKEN KERNELS PASSING THROUGH A 6 SIEVE (WESTERN PRODUCTION).

“SCREENINGS MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH, WHEN DETERMINED IN ACCORDANCE WITH SECTION 868.303, CONTAINS: (1) NOT MORE THAN; (A) 25.0 PERCENT OF WHOLE KERNELS, (B) 10.0 PERCENT OF BROKEN KERNELS REMOVED BY A 5 PLATE, AND (C) 0.2 PERCENT OF BROKEN KERNELS PASSING THROUGH A 4 SIEVE (SOUTHERN PRODUCTION); OR (2) NOT MORE THAN; (A) 25.0 PERCENT OF WHOLE KERNELS, (B) 15.0 PERCENT OF BROKEN KERNELS PASSING THROUGH A 5½ SIEVE, AND MORE THAN (C) 50.0 PERCENT OF BROKEN KERNELS PASSING THROUGH A 6½ SIEVE, AND 10.0 PERCENT OF BROKEN KERNELS PASSING THROUGH A 6 SIEVE (WESTERN PRODUCTION).

“BREWERS MILLED RICE” SHALL CONSIST OF MILLED RICE WHICH, WHEN DETERMINED IN ACCORDANCE WITH SECTION 868.303, CONTAINS NOT MORE THAN 25.0 PERCENT OF WHOLE KERNELS AND WHICH DOES NOT MEET THE KERNEL-SIZE REQUIREMENTS FOR THE CLASS SECOND HEAD MILLED RICE OR SCREENINGS MILLED RICE.

A. Class is usually determined by a cursory examination of the work sample as a whole.

B. When a detailed examination is necessary to determine class (whole kernels) of long grain, medium grain, or short grain milled rice, make this determination on a representative portion of not less than 25 grams.

1. Record the percent of whole kernels on the work record to the nearest tenth percent.

2. If the rice contains 25 percent or less of whole kernels, consider the rice to be second head, screenings, or brewers milled rice.

C. When a detailed examination is necessary to determine class (other types) of long grain, medium grain, or short grain milled rice, make this determination on a representative portion of not less than 25 grams.

1. Record the percent of each type on the work record to the nearest tenth percent.
2. If the rice contains more than 10 percent of “other types,” grade the rice, “Mixed milled rice,” and record the percentages of whole kernels of each type of rice in order of predominance.

D. When a detailed examination is necessary to determine class of second head, screening, or brewers milled rice, make this determination on a representative portion of not less than 50 grams.

1. Southern Production.

- a. Nest a 4 sieve in a bottom pan.
- b. Place the sieve in a mechanical grain sizer and set the timer to 20. Put the rice in the center of the top sieve and actuate the sizer. (If a mechanical sizer is not available, hold the sieves and bottom pan level and using a steady motion, move the sieve from right to left approximately 10 inches, and return from left to right to complete one sieving operation. Repeat this operation 20 times.)
- c. Return the broken kernels that lodged in the perforations of the sieve to the portion that remains on the top of the sieve.
- d. Place a 5 plate in the top carriage and a 6 plate in the bottom carriage of the sizing device.
- e. Run the portion of rice that remained on top of the 4 sieve over the plates.
- f. Hand adjust the broken kernels that passed through the 4 sieve, and the broken kernels that are removed by the 5 plate and 6 plate by removing any whole kernels, broken kernels that obviously do not belong in a particular separation, seeds, and foreign material.
- g. Determine the percentage of broken kernels that passed through the 4 sieve and the percentage removed by the 5 plate and by the 6 plate.

2. Western production.

- a. Nest a 6½ sieve and a 6 sieve in a bottom pan; or a 6½ sieve, 6 sieve, and a 5½ sieve in a bottom pan, as deemed necessary.

b. Place the sieves in a mechanical grain sizer and set the timer to 20. Put the rice in the center of the top sieve and actuate the sizer. (If a mechanical sizer is not available, hold the sieves and bottom pan level and using a steady motion, move the sieve from right to left approximately 10 inches, and return from left to right to complete one sieving operation. Repeat this operation 20 times.)

c. Return the broken kernels that lodged in the perforations of each sieve to the portion that remains on the top of each sieve.

d. Hand adjust the broken kernels that passed through the sieves by removing any whole kernels, broken kernels that obviously do not belong in a particular separation, seeds, and foreign material.

e. Determine the percentage of broken kernels that passed through the 5½, 6, and 6½ sieves.

3. Record the percent of each plate or sieve separation on the work record to the nearest tenth percent.

4. If the rice contains more than 25 percent of whole kernels, consider the rice to be long grain, medium grain, short grain or mixed milled rice.

5.15 ODOR

A. Determine odor on the basis of the lot as a whole or the representative sample as a whole.

1. Off-odors (i.e., musty, sour, and commercially-objectionable foreign odor) are usually detected at the time of sampling.

a. If there is any question as to the odor when the sample is being taken, a part of the sample shall be put into an airtight container to preserve its condition for further examination in the laboratory.

b. Such portions shall be returned to the sample before other tests are made.

2. A musty odor shall be any odor that is earthy, moldy, or ground-like. Do not confuse a burlap bag odor with a musty odor.

3. A sour odor shall be any odor that is rancid, sharp, or acrid.

4. A commercially objectionable foreign odor shall be any odor that is not normal to rice and that, because of its presence, renders the rice unfit for normal commercial usage; e.g., fertilizer, hides, oil products, skunk, smoke, fire-burnt, and decaying animal and vegetable matter odors.

5. Fumigant or insecticide odors are not considered as commercially objectionable foreign odors, unless they are caused by a fumigant or insecticide that does not dissipate quickly. When a sample of rice contains a fumigant or insecticide odor that prohibits a true odor determination, the following guidelines shall apply:

a. The representative sample of rice shall be allowed to air out under forced ventilation (a fume hood) in an open metal container (e.g., a pan) for up to 4 hours; and

b. If the fumigant or insecticide odor still prohibits the determination of the rice's true odor after 4 hours, the rice shall be considered as having a commercially objectionable foreign odor. If the rice is from an unplacarded railcar, notify your supervisor. Supervisors should report such instances to FGIS headquarters.

NOTE: Aromatic (scented) rice shall not be considered as having a commercially objectionable foreign odor if it has an odor known to be common to such rice. Nonaromatic varieties of rice, which have a scented rice-like aroma, shall be considered to have a commercially objectionable foreign odor.

B. When rice is determined to be musty, sour, or have a commercially-objectionable foreign odor, record the type of odor on the work record and in the "Remarks" section of the certificate, and grade the rice "U.S. Sample grade."

5.16 HEATING

A. Determine heating on the basis of the lot as whole.

1. When high temperature develops in rice as the result of excessive respiration, such rice is heating.

2. Heating rice usually gives off a sour or musty odor.

3. Care should be taken never to confuse rice that is warm due to storage in bins, cars, or other containers during hot weather with rice that is heating from excessive respiration.

B. When applicable, show the term, “Heating” on the work record and in the “Remarks” section of the certificate, and grade the rice “U.S. Sample grade.”

5.17 DISTINCTLY LOW QUALITY

A. Determine distinctly low quality on the basis of the lot as a whole or the representative sample as a whole.

B. Milled rice that is obviously affected by other unusual conditions which adversely affect the quality of the rice and which cannot be graded properly by use of the grading factors specified or defined in the standards shall be considered as being of distinctly low quality (e.g., rice found to contain large debris, stones, glass, metal fragments, bird droppings, rodent droppings, castor beans, crotalaria seeds, treated seeds, or toxic substances).

C. When applicable, show the statement “Distinctly low quality on account of (cause or reason).” on the work record and in the “Remarks” section of the certificate, and grade the rice “U.S. Sample grade.”

5.18 INSECT INFESTATION

NOTE: “Weevils” shall include coffee bean weevils, broadnosed grain weevils, rice weevils, granary weevils, maize weevils, and lesser grain borers. “Other insects” shall include ants, beetles, house flies, moths, meal worms, cockroaches, and other insects injurious to stored rice or carriers of disease.

A. Determine infestation on the basis of a representative portion of approximately 500 grams, the lot as a whole, and/or the component sample taken during continuous loading/unloading.

1. Examine the representative portion.

a. If no live or dead insects are found in the portion, make no further check of the sample for insects.

b. If two or more live or dead insects are found, consider the rice to be “U.S. Sample grade.”

c. If one live or dead insect is found, divide out another representative portion of approximately 500 grams from the file sample. (Use the rest of the representative sample if the file sample is less than 500 grams.)

(1) If one or more live or dead insects are found in the second portion, consider the rice to be "U.S. Sample grade."

(2) If no live or dead insects are found in the second portion, do not consider the rice to be "U.S. Sample grade."

2. Examine the rice in the lot; i.e., the surface area of the lot and the area around the lot.

a. If no live or dead insects are found in, on, or about the lot, make no further check of the lot for insects.

b. If two or more live or dead insects are found, consider the rice to be "U.S. Sample grade."

3. Examine the component samples 1/ taken during continuous loading/unloading.

a. Divide out from each component sample a representative portion of approximately 500 grams.

b. Examine the representative portion for live or dead insects.

(1) If no live or dead insects are found in the representative portion, make no further check of the component for insects.

(2) If two or more live or dead insects are found, consider the rice to be "U.S. Sample grade."

1/ As specified in Chapter 7, "Roundlot Inspection." For shiplots and bargelots, a component sample may not represent more than 5000,000 pounds of rice and each subplot must contain two or more approximately equal-sized components.

(3) If one live or dead insect is found, cut another representative portion of approximately 500 grams from the component sample.

(a) If, in the second portion, one or more live or dead insects are found, consider the rice to be “U.S. Sample grade.”

(b) If, in the second portion, no live or dead insects are found, do not consider the rice to be “U.S. Sample grade,” and make no further check of the component for insects.

(c) (Bulk rice only). If, in the second portion, no live or dead insects are found, but one or more insects had been found in a previously inspected component in this or another subplot, consider the rice that is represented by the component sample to be “U.S. Sample grade.”

B. When applicable, show “U.S. Sample grade on account of (live or dead) insects” on the work record and in the “Remarks” section of the certificate, and grade the rice “U.S. Sample grade.”

5.19 TEST WEIGHT PER BUSHEL

NOTE: This factor is not provided for under the “United States Standards for Milled Rice,” but may be determined upon request.

A. Determine test weight per bushel on a representative portion of approximately 1,000 grams.

B. See Chapter 1 of the Grain Inspection Handbook, Book II, for information about performing test weight per bushel determinations.

C. Record the test weight per bushel on the work record to the nearest tenth of a pound and show one of the following statements in the “Remarks” section of the certificate:

1. “Test weight per bushel of (amount) pounds.”

2. “Test weight per bushel of (amount) pounds is approximately equivalent to (amount) kilograms per hectoliter.” (Kilograms per hectoliter is determined by multiplying the test weight per bushel by 1.287.)

NOTE: Bulk density may be determined by dividing the test weight per bushel by 1.2445. Bulk density is the number of pounds in one cubic foot.

5.20 QUANTITATIVE ANALYSIS

A. Quantitative analysis provides an estimate of the quantity (percentage) of whole kernels, second head-sized kernels, screenings-sized kernels, and brewers-sized kernels in a lot or sample of milled rice.

NOTE: This factor is not provided for under the “United States Standards for Milled Rice,” but may be determined upon request.

B. The following definitions are applicable only to this determination.

1. Whole Kernels. Unbroken kernels of rice and broken kernels of rice that are at least three-fourths of an unbroken kernel.

2. Second Head Kernels. Broken kernels of rice and other material that remain on top of a 6 sieve.

3. Screenings Kernels. Broken kernels of rice and other material that pass through a 6 sieve but remain on top of a 5½ sieve.

4. Brewers Kernels. Broken kernels of rice and other material that pass through a 5½ sieve.

C. Perform a milling analysis on long grain, medium grain, short grain, and mixed milled rice as follows:

1. Determine the percent of “broken kernels (total)” on a representative portion of not less than 25 grams. Remove the broken kernels from the 25-gram portion using any device or method that will facilitate the separation of the broken kernels from the whole kernels.

2. Determine the percent of whole kernels by subtracting the percent of broken kernels from 100.0 percent. For example:

$$100.0 \text{ percent} - 19.6 \text{ percent TBK} = 80.4 \text{ percent WK}$$

3. Calculate the adjusted base by dividing the percent of whole kernels in the sample by 100. For example:

$$80.4 \text{ percent WK} \div 100 = .80 \text{ adjusted base}$$

4. Determine the percent of screenings kernels and brewers kernels on a representative portion of approximately 125 grams.

- a. Nest a 6 sieve on top of a 5½ sieve in a bottom pan.
- b. Place the sieves in a mechanical grain sizer and set the timer to 20.
- c. Put the rice in the center of the top sieve and actuate the sizer.

NOTE: If a mechanical sizer is unavailable, hold the sieves and bottom pan level and, using a steady motion, move the sieves from right to left approximately 10 inches, and return from left to right to complete one sieving operation. Repeat this operation 20 times.

- d. Return the material remaining in the perforations of the sieve to the portion that remains on top of the sieve.
- e. Consider all material that passed through the 6 sieve, but remains on top of the 5½ sieve, as screenings kernels. Do not hand adjust the separation.
- f. Consider all material that passes through the 5½ sieve as brewers kernels. Do not hand adjust the separation.

5. Adjust the percent of screenings and brewers by multiplying the “actual” percent of screenings and brewers by the adjusted base. For example:

$$\begin{aligned} 2.1 \% \text{ SMR} \times .80 &= 1.7 \% \text{ SMR} \\ 1.3 \% \text{ BMR} \times .80 &= 1.0 \% \text{ BMR} \end{aligned}$$

6. Determine the percent of second head kernels by adding the percent of screenings and brewers kernels together and then subtracting that total from the percent of “broken kernels (total).” For example:

$$19.6 \% \text{ TBK} - (1.7 \% \text{ SMR} + 1.0 \% \text{ BMR}) = 16.9 \% \text{ SHMR}$$

7. Record the percent of whole kernels, second head kernels, screenings kernels, and brewers kernels on the work record and the certificate to the nearest whole percent.

D. Perform a milling analysis on second head, screenings, and brewers milled rice as follows:

1. Determine the percent of whole kernels on a representative portion of not less than 25 grams. Remove the whole kernels from the 25-gram portion by hand picking.
2. Calculate the adjusted base by subtracting the percent of whole kernels from 100 percent and then dividing the resultant by 100. For example:

$$(100 \text{ percent} - 13.1 \text{ percent WK}) \div 100 = .87 \text{ adjusted base}$$

3. Determine the percent of screenings kernels and brewers kernels on a representative portion of approximately 125 grams.

- a. Nest a 6 sieve on top of a 5½ sieve in a bottom pan.
- b. Place the sieves in a mechanical grain sizer and set the timer to 20.
- c. Put the rice in the center of the top sieve and actuate the sizer.

NOTE: If a mechanical sizer is unavailable, hold the sieves and bottom pan level and, using a steady motion, move the sieves from right to left approximately 10 inches, and return from left to right to complete one sieving operation. Repeat this operation 20 times.

- d. Return the material remaining in the perforations of the sieve to the portion that remains on top of the sieve.
- e. Consider all material that passed through the 6 sieve, but remains on top of the 5½ sieve, as screenings kernels. Do not hand adjust the separation.
- f. Consider all material that passes through the 5½ sieve as brewers kernels. Do not hand-adjust the separation.

4. Adjust the percent of screenings and brewers by multiplying the “actual” percent of screenings and brewers by the adjusted base. For example:

$$17.6 \% \text{ SMR} \times .87 = 15.3 \% \text{ SMR}$$

$$71.6 \% \text{ BMR} \times .87 = 62.3 \% \text{ BMR}$$

5. Determine the percent of second head kernels by adding the percent of whole kernels, screenings, and brewers kernels together and then subtracting the total from 100.0 percent. For example:

$$100.0 \text{ percent} - (13.1 \text{ percent WK} + 15.3 \text{ percent SMR} + 62.3 \text{ percent BMR}) = 9.3 \text{ percent SHMR}$$

6. Record the percent of whole kernels, second head kernels, screenings kernels, and brewers kernels on the work record and the certificate to the nearest whole percent.

5.21 MILLING REQUIREMENTS

THE DEGREE OF MILLING (MILLING REQUIREMENTS) FOR MILLED RICE, I.E., “WELL-MILLED,” “REASONABLY WELL-MILLED,” AND “LIGHTLY MILLED,” SHALL BE EQUAL TO, OR BETTER THAN, THAT OF THE INTERPRETIVE LINE SAMPLES FOR SUCH RICE.

UNDERMILLED MILLED RICE. UNDERMILLED MILLED RICE SHALL BE MILLED RICE WHICH IS NOT EQUAL TO THE MILLING REQUIREMENTS FOR “WELL-MILLED,” “REASONABLY WELL-MILLED,” AND “LIGHTLY MILLED” RICE. GRADES U.S. No. 1 AND U.S. No. 2 SHALL CONTAIN NOT MORE THAN 2.0 PERCENT, GRADES U.S. No. 3 AND U.S. No. 4 NOT MORE THAN 5.0 PERCENT, GRADE U.S. No. 5 NOT MORE THAN 10.0 PERCENT, AND GRADE U.S. No. 6 NOT MORE THAN 15.0 PERCENT OF WELL-MILLED KERNELS. GRADE U.S. No. 5 SHALL CONTAIN NOT MORE THAN 10.0 PERCENT OF RED RICE AND DAMAGED KERNELS (SINGLY OR COMBINED) AND IN NO CASE MORE THAN 6.0 PERCENT OF DAMAGED KERNELS. NOTE: COLOR AND MILLING REQUIREMENTS ARE NOT APPLICABLE TO THE SPECIAL GRADE “UNDERMILLED MILLED RICE.”

- A. Determine milling degree on a representative portion of approximately 250 grams.
- B. Record the milling degree on the work record and the certificate.
 - 1. When rice is considered to be “Undermilled,” determine the percent of well-milled kernels on a representative portion of approximately 25 grams (see Section 5.32) and record the percent of well-milled kernels on the work record and the certificate to the nearest tenth percent.
 - 2. Except as provided above, all grades and grade requirements in the “United States Standards for Milled Rice” shall apply to “Undermilled milled rice.”

5.22 COLOR

- A. Color is usually determined by a cursory examination.
- B. When a detailed examination is necessary to determine color, make this determination on a representative portion of approximately 250 grams.
- C. Describe the color of the rice using one of the following terms:

WHITE	SLIGHTLY GRAY	SLIGHTLY ROSY
CREAMY	LIGHT GRAY	ROSY
	GRAY	VERY ROSY
	DARK GRAY	
- D. For parboiled milled rice, also describe the rice as either “not distinctly colored by the parboiling process,” “distinctly, but not materially colored, by the parboiling process,” or “materially colored by the parboiling process.”
- E. Record color on the work record and the certificate.

5.23 PADDY KERNELS

PADDY KERNELS. WHOLE OR BROKEN UNHULLED KERNELS OF RICE; WHOLE OR BROKEN KERNELS OF BROWN RICE, AND WHOLE OR BROKEN KERNELS OF MILLED RICE HAVING A PORTION OR PORTIONS OF THE HULL REMAINING WHICH COVER ONE-EIGHTH (1/8) OR MORE OF THE WHOLE OR BROKEN KERNELS.

A. Determine the number of paddy kernels on a representative portion of approximately 500 grams (± 1 gram) for all classes, except brewers milled rice.

1. Divide out a representative portion of between 475 and 525 grams.
2. Add or remove kernels (by finger pinching, not pouring) until the required portion is obtained.
3. Record the number of paddy kernels on the work record and the certificate.

B. For brewers milled rice, determine the percentage of paddy kernels on a representative portion of not less than 25 grams. Then, record the percent of paddy kernels on the work record and the certificate to the nearest tenth percent.

C. If the rice contains 10 percent or more of paddy kernels, seeds, or foreign material, singly or combined, do not consider the rice to be milled rice.

5.24 SEEDS

SEEDS. WHOLE OR BROKEN SEEDS OF ANY PLANT OTHER THAN RICE.

OBJECTIONABLE SEEDS. SEEDS OTHER THAN RICE, EXCEPT SEEDS OF ECHINOCHLOA CRUSGALLI (COMMONLY KNOWN AS BARNYARD GRASS, WATERGRASS, AND JAPANESE MILLET).

A. Determine seeds on a representative portion of approximately 500 grams (± 1 gram) for all classes, except brewers milled rice.

1. Divide out a representative portion of between 475 and 525 grams.
2. Add or remove kernels (by finger pinching, not pouring) until the required portion is obtained.
3. Record the number of objectionable seeds and nonobjectionable seeds on the work record.

- B. For brewers milled rice, determine seeds on a representative portion of not less than 25 grams. Then, record the percent of objectionable seeds and non-objectionable seeds on the work record to the nearest hundredth percent.
- C. For all classes, except screenings and brewers milled rice:
1. Add the number of objectionable seeds to the number of heat-damaged kernels and record the sum on the work record and the certificate.
 2. Add the number of total seeds to the number of heat-damaged kernels and paddy kernels, and record the sum on the work record and the certificate.
- D. For screenings milled rice:
1. Record the number of objectionable seeds on the certificate.
 2. Add the number of total seeds to the number of paddy kernels, and record the sum on the work record and the certificate.
- E. For brewers milled rice:
1. Record the percent of objectionable seeds on the certificate to the nearest tenth percent, except the percent of objectionable seeds in U.S. No. 1 Brewers milled rice should be expressed to the nearest hundredth percent.
 2. Add the percent of total seeds to the percent of paddy kernels, and record the sum on the work record and the certificate to the nearest tenth percent.
- F. If the rice contains 10 percent or more of paddy kernels, seeds, or foreign material, singly or combined, do not consider the rice to be milled rice.

5.25 HEAT-DAMAGED KERNELS

HEAT-DAMAGED KERNELS. WHOLE OR BROKEN KERNELS OF RICE WHICH ARE MATERIALLY DISCOLORED AND DAMAGED AS A RESULT OF HEATING AND PARBOILED KERNELS IN NONPARBOILED RICE WHICH ARE AS DARK AS, OR DARKER IN COLOR THAN, THE INTERPRETIVE LINE FOR HEAT-DAMAGED KERNELS.

A. Determine the number of heat-damaged kernels on a representative portion of 500 grams (± 1 gram) for all classes, except screenings and brewers milled rice. (The “United States Standards for Milled Rice” do not provide for determining this factor on screenings and brewers milled rice.)

1. Divide out a representative portion of between 475 and 525 grams.
2. Add or remove kernels (by finger pinching, not pouring) until the required portion is obtained.

B. Record the number of heat-damaged kernels on the work record.

NOTE: If it is determined, by general observation, that the 500-gram portion probably contains 75 or more heat-damaged kernels, divide the 500-gram portion into two portions: a 100-gram portion and a 400-gram portion. Then, examine the 100-gram portion for heat-damaged kernels. If the 100-gram portion contains 25 or more heat-damaged kernels, multiply the number of kernels found by 5 and record that number of heat-damaged kernels on the work record. But if the 100-gram portion contains less than 25 heat-damaged kernels, examine the 400-gram portion and add the number of heat-damaged kernels found in both portions together; then, record that number of heat-damaged kernels on the work record.

C. Add the number of heat-damaged kernels to the number of objectionable seeds and record the sum on the work record and the certificate.

D. Add the number of heat-damaged kernels to the number of total seeds and paddy kernels, and record the sum on the work record and the certificate.

5.26 HEAT-DAMAGED KERNELS, KERNELS DAMAGED BY HEAT, AND/OR PARBOILED KERNELS IN NONPARBOILED RICE

FOR THE CLASSES SCREENINGS AND BREWERS MILLED RICE, GRADES U.S. No. 1 TO U.S. No. 4, INCLUSIVE, SHALL CONTAIN NOT MORE THAN 3.0 PERCENT OF HEAT-DAMAGED KERNELS, KERNELS DAMAGED BY HEAT, AND/OR PARBOILED KERNELS IN NONPARBOILED RICE.

A. For screenings and brewers milled rice, determine the percent of “heat-damaged kernels, kernels damaged by heat, and/or parboiled kernels in nonparboiled rice,” on a representative portion of not less than 25 grams. (The “United States Standards for Milled Rice” do not provide for determining this factor on classes other than screenings and brewers milled rice.)

B. Record the percent of “heat-damaged kernels, kernels damaged by heat, and/or parboiled kernels in nonparboiled rice,” on the work record and the certificate to the nearest tenth percent.

5.27 RED RICE AND DAMAGED KERNELS

RED RICE. WHOLE OR BROKEN KERNELS OF RICE ON WHICH THERE IS AN APPRECIABLE AMOUNT OF RED BRAN.

DAMAGED KERNELS. WHOLE OR BROKEN KERNELS OF RICE WHICH ARE DISTINCTLY DISCOLORED OR DAMAGED BY WATER, INSECTS, HEAT OR ANY OTHER MEANS, AND PARBOILED KERNELS IN NONPARBOILED RICE. “HEAT-DAMAGED KERNELS” SHALL NOT FUNCTION AS DAMAGED KERNELS.

A. Determine red rice and damaged kernels on a representative portion of not less than 25 grams for all classes, except screenings and brewers milled rice.

B. For screenings and brewers milled rice, determine the percent of “heat-damaged kernels, kernels damaged by heat, and/or parboiled kernels in nonparboiled rice,” on a representative portion of approximately 25 grams and determine “badly damaged or extremely red in appearance” on a representative portion of approximately 1,000 grams.

C. Red rice is rice that has a streak of red bran one-half or more the length of the kernel, or two or more streaks that total one-half or more the length of the kernel. A kernel or a piece of kernel of rice that does not have sufficient red bran to be considered as red rice shall be considered as long grain, medium grain, or short grain rice, as appropriate.

D. The major types of damaged kernels are as follows:

1. Insect-Bored Kernels. Whole and broken kernels of rice that have been bored by insects. Kernels that are only slightly eaten by insects and are clean in appearance shall be considered as sound kernels.

2. Fungus-Damaged or “Pecky” Kernels. Whole and broken kernels of rice that have one or more black, brown, red, or other discolored spots or areas on them caused by fungus growth or insects.

3. Kernels Damaged by Heat. Whole and broken kernels of rice that have been discolored by heat but are lighter in color than the interpretive line for heat-damaged kernels.

4. Parboiled Rice in Nonparboiled Rice. Parboiled kernels in nonparboiled rice that are lighter in color than the interpretive line for heat-damaged kernels.

5. Other Damaged Kernels. Whole and broken kernels of rice that are distinctly discolored or damaged from causes other than those listed above shall be considered as damaged kernels. However, those whole and broken kernels that show sheller marks, but are otherwise not distinctly discolored or damaged, shall not function as damaged kernels.

E. For all classes, except screenings and brewers milled rice, record the percent of red rice and damaged kernels on the work record and the certificate to the nearest tenth percent.

F. For screenings and brewers milled rice, record the percent of “heat-damaged kernels, kernels damaged by heat, and/or parboiled kernels in nonparboiled rice,” on the work record and the certificate to the nearest tenth percent.

NOTE: If screenings or brewers milled rice is determined to have a badly damaged or extremely red appearance, record the appearance of the rice on the work record and in the “Remarks” section of the certificate, and grade the rice “U.S. Sample grade.”

5.28 CHALKY KERNELS

CHALKY KERNELS. WHOLE OR BROKEN KERNELS OF RICE WHICH ARE ONE-HALF OR MORE CHALKY.

A. Determine chalky kernels on a representative portion of not less than 25 grams for all classes, except brewers milled rice. (The “United States Standards for Milled Rice” do not provide for determining this factor on brewers rice.)

B. Record the percent of chalky kernels on the work record and the certificate to the nearest tenth percent.

5.29 BROKEN KERNELS

Broken Kernels. Kernels of rice which are less than three-fourths of whole kernels.

- A. Determine broken kernels on a representative portion of not less than 25 grams for all classes, except second head, screenings, and brewers milled rice. (The “United States Standards for Milled Rice” do not provide for determining this factor on second head, screenings, and brewers rice.)
- B. Remove the broken kernels from the 25-gram portion using any device or method that will facilitate the separation of the broken kernels from the whole kernels.
- C. Record the percent of broken kernels on the work record and the certificate to the nearest tenth percent.

5.30 BROKEN KERNELS REMOVED BY A 5 AND 6 PLATE OR THROUGH A 6 SIEVE

5 PLATE. A LAMINATED METAL PLATE 0.142-INCH THICK, WITH A TOP LAMINA 0.051-INCH, PERFORATED WITH ROWS OF ROUND HOLES 0.0781 (5/64) INCH IN DIAMETER, 5/32 INCH FROM CENTER TO CENTER, WITH EACH ROW STAGGERED IN RELATION TO THE ADJACENT ROWS, AND A BOTTOM LAMINA 0.091-INCH THICK, WITHOUT PERFORATIONS.

6 PLATE. A LAMINATED METAL PLATE 0.142-INCH THICK, WITH A TOP LAMINA 0.051-INCH, PERFORATED WITH ROWS OF ROUND HOLES 0.0938 (6/64) INCH IN DIAMETER, 5/32 INCH FROM CENTER TO CENTER, WITH EACH ROW STAGGERED IN RELATION TO THE ADJACENT ROWS, AND A BOTTOM LAMINA 0.091-INCH THICK, WITHOUT PERFORATIONS.

6 SIEVE. A METAL SIEVE 0.032-INCH THICK, PERFORATED WITH ROWS OF ROUND HOLES 0.0938 (6/64) INCH IN DIAMETER, 5/32 INCH FROM CENTER TO CENTER, WITH EACH ROW STAGGERED IN RELATION TO THE ADJACENT ROWS.

- A. Determine broken kernels removed by a 5 and 6 plate or a 6 sieve on a representative portion of not less than 50 grams for all classes, except second head, screenings and brewers milled rice. (The “United States Standards for Milled Rice” do not provide for determining this factor on second head, screenings, and brewers rice.)

NOTE: For U.S. No. 1 and 2 Milled Rice, determine broken kernels removed by a 5 plate on a representative portion of not less than 100 grams.

- B. For southern production rice:

- 1. Place a 5 plate in the top carriage and a 6 plate in the bottom carriage of the rice sizing device.

2. Pour the 50-gram portion on the top plate. After the sample is poured, place the emptied triangular pan under the hopper to catch the rice that flows over the plates.

3. Press the starting switch. Allow the machine to run until the rice stops flowing over the plates into the triangular pan.

4. After the rice stops flowing and the machine is turned off, remove the plates and empty their contents into the rectangular container. Lightly tap the bottom of the plates to remove material retained in the perforations of each plate. Keep the material removed by each plate separate.

5. Hand adjust the material that lodges in the plates to remove any whole kernels, any broken kernels that obviously do not belong with the 5 or 6 plate broken kernels, any seeds, and any foreign material.

C. For western production rice:

Mechanical Sieving Method.

1. Mount a 6 sieve with a bottom pan on a mechanical sieve shaker.

2. Set the stroke counter for 20 strokes.

3. Follow the procedure for operating the mechanical sieve shaker described in Chapter 1, Grain Inspection Handbook, Book II.

4. Return the broken kernels that remain in the perforations of the sieve to the portion that remains on the top of the sieve.

5. Hand adjust the material that passes through the 6 sieve to remove any whole kernels, any broken kernels that obviously do not belong with the 6 sieve broken kernels, any seeds, and any foreign material.

Hand Sieving Method.

1. Mount a 6 sieve on a bottom pan.

2. Pour the representative portion in the center of the sieve.

3. Hold the sieve level in both hands with elbows close to the body and the sieve perforations parallel to the direction of movement.

4. In a steady motion, move the sieve from left to right approximately 10 inches, and return from right to left.

5. Repeat the sieving operation 20 times.

6. Return the broken kernels that remain in the perforations of the sieve to the portion that remains on the top of the sieve.

7. Hand adjust the material that passes through the 6 sieve to remove any whole kernels, any broken kernels that obviously do not belong with the 6 sieve broken kernels, any seeds, and any foreign material.

D. Record the percent of broken kernels removed by the 5 plate and 6 plate (for southern production), and the percent of broken kernels that pass through the 6 sieve (for western production) on the work record and the certificate to the nearest tenth percent, except that the percent of broken kernels removed by the 5 plate in U.S. Nos. 1 and 2 Milled rice shall be recorded to the nearest hundredth percent.

5.31 30 SIEVE MATERIAL

30 SIEVE. A WOVEN WIRE CLOTH SIEVE HAVING 0.0234-INCH OPENINGS, WITH A WIRE DIAMETER OF 0.0154-INCH, AND MEETING THE SPECIFICATIONS OF AMERICAN SOCIETY FOR TESTING AND MATERIALS DESIGNATION E-11-61, AS PRESCRIBED IN FGIS INSTRUCTIONS.

A. Determine 30 sieve material on a representative portion of not less than 50 grams for screenings or brewers milled rice. (The “United States Standards for Milled Rice” do not provide for determining this factor on factors other than screenings and brewers rice.)

B. Sieve the rice as follows:

1. Nest the 30 sieve on top of the bottom pan. Then, place the bottom pan and sieve combination on the orbital sieve shaker. Secure the sieve spring retainer.

2. Set the timer switch at exactly 60 seconds and pour the 50-gram sample on the sieve.

3. Place the sieve cover on top of the sieve and start the shaker.

4. After the shaker has stopped, remove the sieve cover and the sieve. Brush the material adhering to the underside of the sieve into the bottom pan.

5. Consider the brushed material and the material in the bottom pan as "30 sieve material."

NOTE: If an orbital sieve shaker is not available, a mechanical sieve shaker, which is set to 50, may be used.

C. Record the percent of 30 sieve material on the work record and the certificate to the nearest tenth percent.

FOR THE CLASSES SCREENINGS AND BREWERS MILLED RICE, GRADES U.S. No. 1 TO U.S. No. 4, INCLUSIVE, SHALL CONTAIN NOT MORE THAN 1.0 PERCENT OF MATERIAL PASSING THROUGH A 30 SIEVE.

5.32 OTHER TYPES

OTHER TYPES. (1) WHOLE KERNELS OF (I) LONG GRAIN RICE IN MEDIUM OR SHORT GRAIN RICE, (II) MEDIUM GRAIN RICE IN LONG OR SHORT GRAIN RICE, (III) SHORT GRAIN RICE IN LONG OR MEDIUM GRAIN RICE, AND (2) BROKEN KERNELS OF (I) LONG GRAIN RICE IN MEDIUM OR SHORT GRAIN RICE AND (II) MEDIUM OR SHORT GRAIN RICE IN LONG GRAIN RICE, EXCEPT IN U.S. No. 5 AND U.S. No. 6 MILLED RICE. IN U.S. No. 5 AND U.S. No. 6 MILLED RICE, ONLY WHOLE KERNELS WILL APPLY.

NOTE: BROKEN KERNELS OF MEDIUM GRAIN RICE IN SHORT GRAIN RICE AND BROKEN KERNELS OF SHORT GRAIN RICE IN MEDIUM GRAIN RICE SHALL NOT BE CONSIDERED OTHER TYPES.

A. Determine other types on a representative portion of not less than 25 grams for all classes, except second head, screenings, and brewers milled rice. (The "United States Standards for Milled Rice" do not provide for determining this factor on second head, screenings, and brewers rice.)

B. Record the percent of other types on the work record and the certificate to the nearest tenth percent. If the amount of other types exceeds 10.0 percent, grade the rice, "Mixed milled rice."

NOTE: If "other types" is the only grading factor and the amount of "whole kernels - other types" is less than 5.1 percent and the amount of "whole and broken kernels - other types" is more than 5.0 percent, show the following statement in the "Remarks" section of the certificate: "This rice contains (percent) broken kernels of (type) of milled rice."

5.33 WELL-MILLED KERNELS

WELL-MILLED KERNELS. WHOLE OR BROKEN KERNELS OF RICE FROM WHICH THE HULLS AND PRACTICALLY ALL OF THE GERMS AND THE BRAN LAYER HAVE BEEN REMOVED.

NOTE: THIS FACTOR IS DETERMINED ON AN INDIVIDUAL KERNEL BASIS AND APPLIES TO THE SPECIAL GRADE UNDERMILLED MILLED RICE ONLY.

- A. Determine well-milled kernels on a representative portion of not less than 25 grams.
- B. Record the percent of well-milled kernels on the work record and the certificate to the nearest tenth percent.

5.34 FOREIGN MATERIAL

FOREIGN MATERIAL. ALL MATTER OTHER THAN RICE AND SEEDS, HULLS, GERMS, AND BRAN WHICH HAVE SEPARATED FROM THE KERNELS OF RICE SHALL BE CONSIDERED FOREIGN MATERIAL.

- A. Determine foreign material on a representative portion of not less than 100 grams for all classes, except brewers milled rice.
- B. For brewers milled rice, determine foreign material on a representative portion of not less than 25 grams.
- C. Record the percent of foreign material on the work record. If the amount of foreign material exceeds 0.1 percent, record the percent of foreign material on the certificate and grade the rice "U.S. Sample grade."

5.35 COATED MILLED RICE

COATED MILLED RICE. COATED MILLED RICE SHALL BE RICE WHICH IS COATED, IN WHOLE OR IN PART, WITH SUBSTANCES THAT ARE SAFE AND SUITABLE AS DEFINED IN THE REGULATIONS ISSUED PURSUANT TO THE FEDERAL FOOD, DRUG, AND COSMETIC ACT AT 21 CFR 130.3(D).

- A. Determine coated milled rice on a representative portion of not less than 25 grams.
- B. If the rice is considered to be covered with a commercially accepted substance, consider the rice to be "Coated."
- C. When applicable, show the term "Coated" on the work record and the certificate.

(Revised 5/1/97)

5.36 GRANULATED BREWERS MILLED RICE

GRANULATED BREWERS MILLED RICE. GRANULATED BREWERS MILLED RICE SHALL BE MILLED RICE WHICH HAS BEEN CRUSHED BREWERS MILLED OR GRANULATED SO THAT 95.0 PERCENT OR MORE WILL PASS THROUGH A 5 SIEVE, 70.0 PERCENT OR MORE WILL PASS THROUGH A 4 SIEVE, AND NOT MORE THAN 15.0 PERCENT WILL PASS THROUGH A 2½ SIEVE.

A. Determine granulated brewers milled rice on a representative portion of not less than 50 grams of brewers milled rice.

B. Sieve the rice as follows:

1. Nest a 5 sieve, a 4 sieve, and a 2½ sieve on top of a bottom pan mounted on a mechanical sieve shaker.

2. Set the stroke counter for 20 strokes.

3. Follow the procedure for operating the mechanical sieve shaker described in Chapter 1, Grain Inspection Handbook, Book II.

4. Return the kernels that remain in the perforations of each sieve to the portion that remains on the top of that sieve.

5. Do not hand adjust the material.

C. Record the percent of 5 sieve, 4 sieve, and 2½ sieve material on the work record. When applicable, show the term “Granulated” on the work record and the certificate. If brewers milled rice contains more than 15 percent of broken kernels that will pass through a 2½ sieve, grade the rice “U.S. Sample grade.”

5.37 PARBOILED MILLED RICE/UNGELATINIZED KERNELS

PARBOILED MILLED RICE SHALL BE MILLED RICE IN WHICH THE STARCH HAS BEEN GELATINIZED BY SOAKING, STEAMING, AND DRYING. GRADES U.S. No. 1 TO U.S. No. 6, INCLUSIVE, SHALL CONTAIN NOT MORE THAN 10.0 PERCENT OF UNGELATINIZED KERNELS. GRADES U.S. No. 1 AND U.S. No. 2 SHALL CONTAIN NOT MORE THAN 0.1 PERCENT, GRADES U.S. No. 3 AND U.S. No. 4 NOT MORE THAN 0.2 PERCENT, AND U.S. No. 5 AND U.S. No. 6 NOT MORE THAN 0.5 PERCENT OF NONPARBOILED RICE. IF THE RICE IS:

- (1) NOT DISTINCTLY COLORED BY THE PARBOILING PROCESS, IT SHALL BE CONSIDERED "PARBOILED LIGHT;"
- (2) DISTINCTLY BUT NOT MATERIALLY COLORED BY THE PARBOILING PROCESS, IT SHALL BE CONSIDERED "PARBOILED;"
- (3) MATERIALLY COLORED BY THE PARBOILING PROCESS, IT SHALL BE CONSIDERED "PARBOILED DARK;"

THE COLOR LEVELS FOR "PARBOILED LIGHT," "PARBOILED," AND "PARBOILED DARK" SHALL BE IN ACCORDANCE WITH THE INTERPRETIVE LINE SAMPLES FOR PARBOILED RICE.

NOTE: THE MAXIMUM LIMITS FOR "CHALKY KERNELS," "HEAT-DAMAGED KERNELS," "KERNELS DAMAGED BY HEAT," AND "COLOR REQUIREMENTS" IN SECTIONS 868.310, 868.311, 868.312, AND 868.313 ARE NOT APPLICABLE TO THE SPECIAL GRADE "PARBOILED MILLED RICE."

UNGELATINIZED KERNELS. WHOLE OR BROKEN KERNELS OF PARBOILED RICE WITH DISTINCT WHITE OR CHALKY AREAS DUE TO INCOMPLETE GELATINIZATION OF THE STARCH.

NOTE: Parboiled milled rice shall be milled rice in which at least 90 percent of the kernels are colored by the parboiling process.

A. When a detailed examination is necessary to determine color, make this determination on a representative portion of approximately 250 grams. Describe the rice as either:

1. "Parboiled light" if it is not distinctly colored by the parboiling process,
2. "Parboiled" if it is distinctly, but not materially colored, by the parboiling process, or
3. "Parboiled dark" if it is materially colored by the parboiling process.

B. When a detailed examination is necessary to determine nonparboiled or ungelatinized kernels, make this determination on a representative portion of not less than 25 grams.

C. Record the color and the percent of ungelatinized kernels on the work record and the certificate to the nearest tenth percent. If the rice contains at least 90.0 percent parboiled kernels, consider the rice to be “parboiled” and show the special grade “Parboiled Light,” “Parboiled,” or “Parboiled Dark,” as applicable, on the gradeline of the certificate.

NOTE: Except as specified, all grades and grade requirements in the “United States Standards for Milled Rice” apply to “Parboiled Milled Rice.”

5.38 GLUTINOUS MILLED RICE/NONCHALKY KERNELS

GLUTINOUS MILLED RICE SHALL BE SPECIAL VARIETIES OF RICE (*ORYZA SATIVA* L. *GLUTINOSA*) WHICH CONTAIN MORE THAN 50 PERCENT CHALKY KERNELS. FOR LONG GRAIN, MEDIUM GRAIN, AND SHORT GRAIN MILLED RICE, GRADE U.S. NO. 1 SHALL CONTAIN NOT MORE THAN 1.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 2 NOT MORE THAN 2.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 3 NOT MORE THAN 4.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 4 NOT MORE THAN 6.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 5 NOT MORE THAN 10.0 PERCENT OF NONCHALKY KERNELS, AND GRADE U.S. NO. 6 NOT MORE THAN 15.0 PERCENT OF NONCHALKY KERNELS.

FOR SECOND HEAD MILLED RICE, GRADE U.S. NO. 1 SHALL CONTAIN NOT MORE THAN 4.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 2 NOT MORE THAN 6.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 3 NOT MORE THAN 10.0 PERCENT OF NONCHALKY KERNELS, GRADE U.S. NO. 4 NOT MORE THAN 15.0 PERCENT OF NONCHALKY KERNELS, AND GRADE U.S. NO. 5 NOT MORE THAN 20.0 PERCENT OF NONCHALKY KERNELS.

FOR SCREENINGS MILLED RICE, THERE ARE NO GRADE LIMITS FOR PERCENT ON NONCHALKY KERNELS. FOR BREWERS MILLED RICE, THE SPECIAL GRADE “GLUTINOUS MILLED RICE” IS NOT APPLICABLE.

NOTE: THE MAXIMUM LIMITS FOR “CHALKY KERNELS” IN SECTIONS 868.310, 868.311, AND 868.312 ARE NOT APPLICABLE TO THE SPECIAL GRADE “GLUTINOUS MILLED RICE.”

A. Determine nonchalky kernels on a representative portion of not less than 25 grams.

B. Record the percent of nonchalky kernels on the work record and the certificate to the nearest tenth percent. If the rice is a glutinous variety and contains less than 50.0 percent nonchalky kernels, consider the rice to be “glutinous” and show the special grade “Glutinous,” as applicable, on the gradeline of the certificate.

NOTE: Except as specified, all grades and grade requirements in the “United States Standards for Milled Rice” apply to “Glutinous Milled Rice.”

5.39 AROMATIC MILLED RICE

AROMATIC MILLED RICE SHALL BE SPECIAL VARIETIES OF RICE (*ORYZA SATIVA* L. SCENTED) THAT HAVE A DISTINCTIVE AND CHARACTERISTIC AROMA, E.G., BASMATI AND JASMINE RICE.

- A. Determine aromatic on the basis of the odor of the lot as a whole or the representative sample as a whole.
- B. If the rice is an aromatic variety and has an odor common to such rice, consider the rice to be “aromatic” and show the special grade “Aromatic” on the gradeline of the certificate.

5.40 ENRICHED MILLED RICE

NOTE: This factor is not provided for under the “United States Standards for Milled Rice,” but may be determined upon request. When deemed necessary, official personnel may use one or more alternative procedures in conjunction with this enrichment test; e.g., “spot checking” the enrichment process, smelling or visually examining the rice for evidence of enrichment, conducting multiple tests, or sending “opinion” samples to the TSD-Commodity Testing Laboratory.

CAUTION: Conduct this test in a well-ventilated area. A fume hood is not required when performing the test, but it should be used when preparing stock solutions.

REFERENCE: See Attachment 3, “Equipment and Chemicals for Enrichment Analyses,” to this chapter.

- A. Determine enrichment on a representative portion of approximately 50 grams. Enriched milled rice is milled rice in which there has been added a vitamin premix that contains thiamine, niacin, and iron.
- B. Grind the sample for 15 to 30 seconds. Mix well.
- C. Place approximately 1 gram of the sample to be tested in a porcelain spot plate cavity. Level and pack the sample with a spatula. Similarly, place 1 gram of standard “unenriched” rice in a cavity next to the test rice.
- D. Add 3 drops of hydrogen peroxide with the drop bottle to the test rice and the standard rice, being careful not to let the liquid drain off. Allow it to soak in.
- E. Put 3 drops of HCl 4N on top of the wetted area. Then, add 3 drops of KSCN solution to the wetted spot.

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F. If the test rice begins to develop a light red color almost immediately and small dark red spots appear after about 10 minutes, consider the rice to be “Enriched.” If no red color develops and the test rice looks like the standardized rice, consider the rice to be “Unenriched.”

G. When applicable, show the statement, “This rice was found to be enriched,” on the work record and certificate.

5.41 TOTAL OIL AND FREE FATTY ACID

NOTE: This factor is not provided for under the “United States Standards for Milled Rice” but may be determined upon request.

A. Determine total oil and free fatty acid on a work sample of approximately 300 grams.

CAUTION: *Conduct this test in a well-ventilated area.*

REFERENCE: See Attachment 4, “Equipment and Chemicals for Total Oil and Free Fatty Acid Analyses,” to this chapter.

B. Divide out a 300-gram representative portion and determine the moisture content. Record this information on the Total Oil and Free Fatty Acid Worksheet (Attachment 5).

C. Reduce the remainder of the work sample to no less than 15 grams. Grind the sample portion as follows:

1. Turn on the grinder and allow it to reach maximum RPM.
2. Adjust the feed gate to provide a feed rate of approximately 2 grams per second.
3. Pour the sample into the feed hopper and allow it to grind.
4. Press the plunger three to five times and tap above the clear plastic cyclone to clear the grinder of all loose flour.
5. Hold the plunger down, remove the sample jar, and cap it.
6. Shake and rotate the sample jar to loosen caked flour from the sample jar.
7. Lightly clean the grinder with a brush after each sample. If practicable, also vacuum the grinding chamber.

D. Extract the oil from the rice as follows:

NOTE: Prior to beginning the procedure, turn the analytical balance on and calibrate it by following the manufacturer's instructions and then verify its accuracy using a 10-gram, Class S weight.

1. Make sure the extraction beaker is clean and dry.
2. Clean and dry your hands or wear clean plastic or rubber gloves. This is to limit the transfer of dust and oil from hands to extraction beaker, filter paper, or extraction thimble.
3. Weigh 1/ the extraction beaker on an analytical balance to the nearest 0.0000 g and record the weight on the worksheet. Handle the extraction beaker only at the top, with your forefinger and thumb or with gloved hands. Handle the beaker as little as possible to limit transferring of oil from your hands to the beaker.
4. Place filter paper or a weighing dish on the analytical balance and tare off its weight.
5. Mix the ground sample in the sample bottle with the spatula. Place 10 grams (\pm .02 grams) of ground sample on the filter paper or weighing dish and record the net weight on the worksheet.
6. Pour the sample into the extraction thimble and plug with nonabsorbent cotton; or place sample on filter paper, fold the filter paper tightly with the sample inside, and then place it in the extraction thimble.

NOTE: Before its initial use, wash the nonabsorbent cotton with petroleum ether.

7. Turn on the fan in the fume hood. Start the cold water running through the cooling chamber.
8. Place the thimble with the sample into the open ended Goldfish tube and lock it into place on the extractor 2/. To extend the life of the heating elements, run two, four, or six samples at a time. Turn off the heating elements not being used.

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1/ When using an analytical balance, the balance's doors should be closed and the balance allowed to stabilize before recording the weight.

2/ The main power switch to the Goldfish fat/oil extractor should be turned off before: (1) raising or lowering the heating elements; (2) changing the heating selector switch; or (3) putting extraction beakers up or taking them down.

NOTE: Steps 9 through 19 shall be performed inside the fume hood by a technician who is wearing non-absorbent gloves and appropriate eye protection. Strict adherence to the following procedures are essential.

9. Add approximately 50 ml of petroleum ether into the weighed extraction beaker. Cover one of the heating elements on the extractor with a heating element cover.

10. Attach the extraction beaker to the extractor with the attachment ring and tighten well. Remove the heating element cover.

11. Raise the heating element to the bottom of the beaker and extract for 2½ hours at the standard heat setting (approximately 8). Begin the 2½-hour period when the first drop comes through the open-end tube.

NOTE: The standard heat setting should yield approximately 150 drops per minute of petroleum ether from the bottom of the open-end tube, depending on the proximity of the heating element to the bottom of the beaker. Adjust the dial and/or height of the heating element to yield this amount.

12. After starting, check to see if petroleum ether is escaping from the system. When the petroleum ether starts to boil, the level of petroleum ether in the beaker will drop. This drop is because some of the petroleum ether is in a gaseous state. After the initial drop, if the level continues to drop, then there is a leak in the system. Lower the heating element, retighten the ring, raise the heating element, continue extracting, and recheck for escaping petroleum ether.

13. Check the petroleum ether for cloudiness. If cloudy, rice particles have infiltrated the petroleum ether. Stop the procedure and determine if the rice particles came from an improperly seated cotton plug, from a leaking thimble, or from rice particles on the outside of the thimble. Start the procedure over with a new sample portion and make the proper corrections.

14. Make sure that water condensation on the cooling chamber does not drip onto the heating element or drip into the beaker when it is released.

15. At the end of the extraction period, turn off and lower the heating element. Release vacuum in the beaker by pulling the tab on top of the extractor. Cover the heating element with a heating element cover. Release the beaker, remove the open-end tube with the sample and replace it with the closed-end tube, reattach the beaker, remove the heating element cover, raise the heating element, and heat the beaker to collect any excess petroleum ether.

16. Remove the thimble from the open-end tube. Place the thimble with the sample in the fume hood to dry. After drying, remove the filter paper with the rice (or cotton and rice) from thimble, save thimble and cotton for future extractions. Throw rice/filter away.

17. When the level of petroleum ether in the extraction beaker reaches about 1/8 inch, turn off and lower the heating element. Place the heating element cover over the heating element, release the vacuum, and release the beaker.

18. Remove and empty the closed-end tube into the used petroleum container or dispose of the used petroleum ether by letting it evaporate in the fume hood. Do not turn the fume hood fan off until all petroleum ether is evaporated and sufficient air has been used to flush the fumes from the fume hood exhaust system.

19. Evaporate remaining ether in the extraction beaker by placing the beaker in the front part of the fume hood with the door to the fume hood lowered to a level just above the beaker's top. When the beaker appears to be free of ether, place it upright on the heating element cover that is on the element for a few seconds to assure that all remaining ether is removed. (Be careful not to allow oil to char.) Remove the extraction beaker from the element cover and let the beaker cool in the fume hood to room temperature.

20. Weigh the cool, dry extraction beaker and record the weight on the worksheet.

E. Determine the amount of free fatty acid as follows:

1. Using a crystallizing dish and a magnetic stirrer-hot plate, heat a water bath to 60-65° C.

2. Prepare a titration solvent as follows:

a. Place 25 ml of alcohol reagent - specially denatured anhydrous ethyl alcohol - in a 250-ml beaker.

b. Add 1 ml of phenolphthalein with the pipet to the alcohol.

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c. Place the beaker in the hot water bath and warm the titration solvent. Add a stirring bar to the beaker and start it stirring.

d. Using the buret, titrate with 0.02 N Sodium Hydroxide (NaOH) slowly, one drop at a time, into the titration solvent until a faint pink color persists.

NOTE: Larger amounts of titration solvent may be prepared provided the ratio is the same (for example, 75 ml alcohol to 3 ml of phenolphthalein). Unused solvent must be stored in a tightly sealed container and used within 2 days.

3. Add 10 ml of the titration solvent with the pipet to the residue in the extraction beaker. Rinse the sides of the beaker while adding the titration solvent.

4. Place the extraction beaker in a hot (60-65° C) water bath and let the temperature stabilize, then add the stirring bar and start stirring.

5. Zero the buret with NaOH and titrate the sample until a faint pink color persists for at least 1 minute.

6. Determine the amount of NaOH titrated and record it on the worksheet. Record the amount to the nearest one hundredth of a milliliter.

7. Empty the contents of the extraction beaker down the drain with a large amount of water. Carefully wash the extraction beaker with soap and water making sure all oil residue is removed. Rinse the beaker with distilled water. Cover the beaker with a towel to help keep it clean and let it air dry.

8. Should the buret or stopcock become plugged with crystallized NaOH or foreign material, clean them with distilled water and let dry. If water is present in the buret, rinse it with NaOH before using.

F. Calculate the percent of total and free fatty acid as follows:

1. Percent of Total Oil, Moisture-Free Basis (TODB).

$(\text{Wt. of Beaker with Oil Residue} - \text{Tare Wt. of Beaker}) \times 10\% = \% \text{ Total Oil}$
 $(\% \text{ Total Oil} \div (100 - \% \text{ Moisture})) \times 100 = \% \text{ TODB}$

EXAMPLE: $(69.1003 - 69.0244) \times 10 = 0.759$ or 0.76 %
 $(0.759 \div (100 - 11.9)) \times 100 = 0.862$ or 0.86 %

2. Percent of Free Fatty Acid in Oil (FFA/O).

Normality of NaOH Titrate X ml of NaOH Used in Titrating X 28.2 ÷
(Weight of Beaker with Oil Residue - Tare Weight of Beaker) = % FFA/O

EXAMPLE: 0.0202 X 3.25 X 28.2 ÷ 0.0759 = 24.4 or 24 percent

3. Percent of Free Fatty Acid in Sample (FFA/S).

% TODB X % FFA/O ÷ 100 = % FFA/S

EXAMPLE: 0.862 X 24.4 ÷ 100 = 0.212 or 0.21 %

G. Maintain a file sample of at least 300 grams of whole rice on each sample analyzed for TOFFA. Keep file samples in a refrigerator at approximately 40° F.

5.42 INTERPRETIVE LINE SLIDES AND SAMPLES

A. The interpretive line slide (ILS) system assists inspectors in making subjective grading decisions. This system consists of a portable tabletop transparency viewer and photographic slide transparencies. The viewer uses a precisely controlled light source of low intensity designed to provide a standard picture and to protect the slide. Therefore, only use the special viewer for ILS'. Other light sources, such as a regular slide projector, may provide a distorted picture and damage the ILS'. Use of such a projector is not prohibited; however, once used in this manner, the slides may not be used for official purposes.

Table 2
Currently Available Interpretive Line Slides

RICE 1.0 OBJECTIONABLE SEEDS
RICE 1.1 NON-OBJECTIONABLE SEEDS (CALIFORNIA)
RICE 1.2 NON-OBJECTIONABLE SEEDS (SOUTHERN)
RICE 2.0 HEAT DAMAGED KERNELS
RICE 2.1 KERNELS DAMAGED BY HEAT
RICE 2.7 KERNELS DAMAGED BY INSECTS (PECK)
RICE 6.1 PADDY KERNELS IN MILLED RICE (PARTIALLY UNHULLED)
RICE 7.0 SMUT DAMAGED KERNELS
RICE 9.0 RELATED MATERIAL
RICE 9.1 UNRELATED MATERIAL

B. Interpretive line samples are actual samples enclosed in clear plastic containers. Overexposure to direct light can result in the bleaching of these samples. Therefore, interpretive line samples should be stored in a cool, dark place.

(Revised 5/1/97)

Attachment 1
RICE INSPECTION HANDBOOK
Chapter 5
Inspection of Milled Rice
7/1/94

FGIS FORM-911, "RICE SAMPLE TICKET"

I 56201			CERTIFICATE NO. A17647			TO BOARD			FIELD OFFICE Stuttgart		
LOCATION Farmland Mill				QUANTITY 1282 – 50 Kilos Poly Bags							
IDENTIFICATION SP 961711				MOVEMENT (Circle)							
SEAL BROKEN				01 IN	02 OUT X	03 BULK	04 EXPORT	05 CAR			
SEAL APPLIED AG 222667-70				06 TRUCK	07 LOCAL	08 BAGGED X	09 SUB				
SAMPLER ME				DATE SAMPLED 5-2-92			LAB NO.			CLASS LGMR	
IDENTIFYING MARKS U.S./ Long Grain/ Milled Rice/ 50 Kilos											
FACTOR	GRAMS		ACG INSP.	SUPV.	BOARD	FACTOR	GRAMS		ACG INSP.	SUPV.	BOARD
	PORT.	SEP.					PORT.	SEP.			
01 C			CR	CR		12 TBK	25.71	4.35	16.9	15.9	
02 CH	25.13	.21	0.8	0.5		13 TS-HT	500		22	22	
03 FM						14 4S					
04 HT	500		4	3		15 5P/5½S					
05 HT/OBS	500		20	18		16 6P/6S					
06 M			11.9	11.8		17 6□S					
07 MD			WM	WM		18 30S					
08 NOBS						19 WK	43.98	36.30	57.6	60.6	
09 OT			6.5	7.2		20 TR	1002	699	69.9	70.4	
10 P	500		2	4		21					
11 RR&DK	25.71	1.26	5.0	5.4		22					
REMARKS											
ACG OR INSPECTOR Dave Boatman						CODE NO. 0123			DATE INSP. 5/2/92		
ACG OR INSPECTOR'S GRADE U.S. No. 5 LGMR											
SUPERVISOR Tom Logan				DATE SUPV. 5/3/92		REVIEWED BY			DATE REVIEWED		
SUPERVISOR'S GRADE U.S. No. 5 LGMR						BOARD'S GRADE					
FORM FGIS-911 (2-89) RICE SAMPLE TICKET USDA- FGIS											

(RESERVED)

GRADES AND GRADE REQUIREMENTS FOR MILLED RICE
Long Grain, Medium Grain, Short Grain, and Mixed Milled Rice

Grading Factors	Grades U.S. Nos.					
	1	2	3	4	5	6
Seeds, Heat-Damaged, and Paddy Kernels Total (Singly or Combined) Heat-Damaged Kernels and Objectionable Seeds (Singly or Combined)	Maximum number in 500 grams					
	2	4	7	20	30	75
	1	2	5	15	25	75
	Maximum limit (percent)					
Red Rice and Damaged Kernels (Singly or Combined) <u>5/</u> <u>6/</u>	0.5	1.5	2.5	4.0	6.0	15.0
Chalky Kernels <u>1/</u> <u>2/</u> in Long Grain	1.0	2.0	4.0	6.0	10.0	15.0
in Medium/Short Grain	2.0	4.0	6.0	8.0	10.0	15.0
Broken Kernels - Total	4.0	7.0	15.0	25.0	35.0	50.0
- Removed by a 5 Plate <u>3/</u>	0.04	0.06	0.1	0.4	0.7	1.0
- Removed by a 6 Plate <u>3/</u>	0.1	0.2	0.8	2.0	3.0	4.0
- Removed by 6 Sieve <u>3/</u>	0.1	0.2	0.5	0.7	1.0	2.0
Other Types <u>4/</u> - Whole Kernels	-	-	-	-	10.0	10.0
- Whole and Broken Kernels	1.0	2.0	3.0	5.0	-	-
Minimum level						
Color <u>1/</u>			Milling Requirement <u>5/</u>			
U.S. No. 1	Shall be white or creamy		Well Milled			
U.S. No. 2	May be slightly gray.		Well Milled			
U.S. No. 3	May be light gray.		Reasonably Well Milled			
U.S. No. 4	May be gray or slightly rosy.		Reasonably Well Milled			
U.S. No. 5	May be dark gray or rosy.		Lightly Milled			
U.S. No. 6	May be dark gray or rosy.		Lightly Milled			
U.S. Sample grade shall be rough rice which:						
(a) does not meet the requirements for any of the grades from U.S. No. 1 to U.S. No. 6, inclusive;						
(b) contains more than 15.0 percent of moisture;						
(c) is musty or sour, or heating;						
(d) has a commercially-objectionable foreign odor;						
(e) contains more than 0.1 percent of foreign material;						
(f) contains two or more live or dead weevils or other live insects, insect webbing, or insect refuse; or						
(g) is otherwise of distinctly low quality.						
<u>1/</u> For the special grade Parboiled milled rice, see Section 868.315(c).						
<u>2/</u> For the special grade Glutinous milled rice, see Section 868.315(e).						
<u>3/</u> Plates should be used for southern production rice and sieves should be used for western production rice, but any device or method which gives equivalent results may be used.						
<u>4/</u> These limits do not apply to the class Mixed Milled Rice.						
<u>5/</u> For the special grade Undermilled milled rice, see Section 868.315(d).						
<u>6/</u> Grade U.S. No. 6 shall contain not more than 6.0 percent damaged kernels.						

GRADES AND GRADE REQUIREMENTS FOR MILLED RICE
Second Head Milled Rice

Grading Factors	Grades U.S. Nos.				
	1	2	3	4	5
Seeds, Heat-Damaged, and Paddy Kernels Total (Singly or Combined)	15	20	35	50	75
Heat-Damaged Kernels and Objectionable Seeds (Singly or Combined)	5	10	15	25	40
Red Rice and Damaged Kernels (Singly or Combined)	1.0	2.0	3.0	5.0	10.0
Chalky Kernels <u>1/</u> <u>2/</u>	4.0	6.0	10.0	15.0	20.0
<div> <div>Minimum level</div> <div> <div>Color <u>1/</u></div> <div> U.S. No. 1 Shall be white or creamy. U.S. No. 2 May be slightly gray. U.S. No. 3 May be light gray. U.S. No. 4 May be dark or slightly rosy. U.S. No. 5 May be dark gray or rosy. </div> </div> <div> <div>Milling Requirement <u>2/</u></div> <div> Well Milled Well Milled Reasonably Well Milled Reasonably Well Milled Lightly Milled </div> </div> </div>					
U.S. Sample grade shall be milled rice which: <p>(a) does not meet the requirements for any of the grades from U.S. No. 1 to U.S. No. 5, inclusive;</p> <p>(b) contains more than 15.0 percent of moisture;</p> <p>(c) is musty or sour, or heating;</p> <p>(d) has a commercially-objectionable foreign odor;</p> <p>(e) contains more than 0.1 percent of related material;</p> <p>(f) contains two or more live or dead weevils or other live insects, insect webbing, or insect refuse; or</p> <p>(g) is otherwise of distinctly low quality.</p> <p><u>1/</u> For the special grade Parboiled milled rice, see Section 868.315(c). <u>2/</u> For the special grade Glutinous brown rice, see Section 868.315(e). <u>3/</u> For the special grade Undermilled milled rice, see Section 868.315(d).</p>					

GRADES AND GRADE REQUIREMENTS FOR MILLED RICE
Screenings Milled Rice

Grading Factors	Grades U.S. Nos. <u>4/</u> <u>5/</u>				
	1	2	3	4	5
Paddy Kernels and Seeds Total (Singly or Combined)	30	75	125	175	250
Objectionable Seeds	20	50	90	140	200
Chalky Kernels <u>1/</u> <u>3/</u>	5.0	8.0	12.0	20.0	30.0
Minimum level					
Color <u>1/</u>			Milling Requirement <u>2/</u>		
U.S. No. 1 Shall be white or creamy.			Well Milled		
U.S. No. 2 May be slightly gray.			Well Milled		
U.S. No. 3 May be light gray or slightly rosy.			Reasonably Well Milled		
U.S. No. 4 May be gray or rosy.			Reasonably Well Milled		
U.S. No. 5 May be dark gray or very rosy.			Lightly Milled		
U.S. Sample grade shall be milled rice which:					
(a) does not meet the requirements for any of the grades from U.S. No. 1 to U.S. No. 5, inclusive;					
(b) contains more than 15.0 percent of moisture;					
(c) is musty or sour, or heating;					
(d) has a commercially-objectionable foreign odor;					
(e) has a badly damaged or extremely red appearance;					
(f) contains more than 0.1 percent of related material;					
(g) contains two or more live or dead weevils or other live insects, insect webbing, or insect refuse;					
or					
(h) is otherwise of distinctly low quality.					
<u>1/</u> For the special grade Parboiled milled rice, see Section 868.315(c).					
<u>2/</u> For the special grade Undermilled milled rice, see Section 868.315(d).					
<u>3/</u> For the special grade Glutinous milled rice, see Section 868.315(e).					
<u>4/</u> Grades U.S. No. 1 to U.S. No. 4, inclusive, shall contain not more than 3.0 percent of heat-damaged kernels, kernels damaged by heat, and parboiled kernels in nonparboiled rice.					
<u>5/</u> Grades U.S. No. 1 to U.S. No. 4, inclusive, shall contain not more than 1.0 percent of material passing through a 30 sieve.					

GRADES AND GRADE REQUIREMENTS FOR MILLED RICE
Brewers Milled Rice

Grading Factors		Grades U.S. Nos. <u>3/</u> <u>4/</u>				
		1	2	3	4	5
Paddy Kernels and Seeds		Maximum number in 500 grams				
Total (Singly or Combined)		0.5	1.0	1.5	3.0	5.0
Objectionable Seeds		0.05	0.1	0.2	0.4	1.5
Minimum level						
Color <u>1/</u>		Milling Requirement <u>2/</u>				
U.S. No. 1	Shall be white or creamy.	Well Milled				
U.S. No. 2	May be slightly gray.	Well Milled				
U.S. No. 3	May be light gray or slightly rosy.	Reasonably Well Milled				
U.S. No. 4	May be gray or rosy.	Reasonably Well Milled				
U.S. No. 5	May be dark gray or very rosy.	Lightly Milled				
U.S. Sample grade shall be milled rice of this class which:						
(a) does not meet the requirements for any of the grades from U.S. No. 1 to U.S. No. 5, inclusive;						
(b) contains more than 15.0 percent of moisture;						
(c) is musty or sour, or heating;						
(d) has a commercially-objectionable foreign odor;						
(e) has a badly damaged or extremely red appearance;						
(f) contains more than 0.1 percent of related material;						
(g) contains more than 15.0 percent of broken kernels that will pass through a 2½ sieve.						
(h) contains two or more live or dead weevils or other live insects, insect webbing, or insect refuse; or						
(i) is otherwise of distinctly low quality.						
<u>1/</u> For the special grade Parboiled milled rice, see Section 868.315(c).						
<u>2/</u> For the special grade Undermilled milled rice, see Section 868.315(d).						
<u>3/</u> Grades U.S. No. 1 to U.S. No. 4, inclusive, shall contain not more than 3.0 percent of heat-damaged kernels, kernels damaged by heat, and parboiled kernels in nonparboiled rice.						
<u>4/</u> Grades U.S. No. 1 to U.S. No. 4, inclusive, shall contain not more than 1.0 percent of material passing through a 30 sieve. This limit does not apply to the special grade Granulated brewers milled rice.						

EQUIPMENT AND CHEMICALS FOR ENRICHMENT ANALYSES

Safety Equipment.

1. Safety goggles for conducting test, full-face protection shield for mixing solutions.
2. Plastic or rubber apron and gloves.
3. Eye wash facilities (portable eye wash bottles are not acceptable--See FGIS Instruction 370-4).

Laboratory Equipment.

1. Spatula (Plastic) - with 3-inch blade (1 each).
2. Porcelain spot plate (4 inches X 4 inches) with concave depression, white (1 each).
3. Grinder (Moulnex or equivalent) (1 each).
4. 25-ml graduated cylinder (Nalgene) (1 each).
5. 250-ml graduated cylinder (Nalgene) (1 each).
6. Storage bottles, 32-oz. capacity with caps (Nalgene) (3 each).
7. Small funnels (Nalgene) (1 each).
8. Polyethylene drop bottles (4-oz. capacity) (3 each).

Chemicals. 1/

1. 1-pound - Potassium thicyanate (KSCN), reagent crystals.
2. 1 pint - Hydrochloric acid (HCl) 37 percent reagent grade in safe-kote container.
3. 500-ml bottle - 3 percent hydrogen peroxide laboratory grade.

Stock Solutions.

CAUTION: Prepare solutions in a well-ventilated area.

- 1/ A Material Safety Data Sheet must be on hand for each chemical.

Attachment 3
RICE INSPECTION HANDBOOK
Chapter 5
Inspection of Milled Rice
5/1/97

1. KSCN 10 percent.
 - a. Weigh 50 grams of KSCN crystals on a FGIS precision-class scale.
 - b. Transfer the crystals to a 32-oz. Nalgene storage bottle.
 - c. Add 500 ml of water measured in the 250-ml graduated cylinder.
 - d. Shake until crystals are dissolved. Label the storage bottle "10 percent KSCN" with date of preparation.
2. HCl 4N.
 - a. Measure 417 ml of water into a 32-oz. Nalgene storage bottle.
 - b. Add 166 ml of the 37 percent HCl to the water slowly. Some heat may be generated. DO NOT ADD THE WATER TO THE ACID.
 - c. Screw on the top and shake to mix. Label the storage bottle "HCl - 4N" with date of preparation.
3. 3 percent Hydrogen peroxide. Use as purchased.

Handling.

Put approximately 100 ml of each of the stock solutions into separate polyethylene drop bottles.

EQUIPMENT AND CHEMICALS FOR TOTAL OIL AND FREE FATTY ACID ANALYSES

Safety Equipment.

1. Safety goggles; Impact and Chemical Splash Goggles.
2. Plastic or rubber gloves; Powder Vinyl Gloves.
3. Plastic or rubber apron (e.g laboratory smock).
4. Fire blanket.
5. Fire extinguishers; Class BC CO₂ extinguisher.
6. Eye wash station.
7. Laboratory safety signs; No Smoking, No Eating, Authorized Personnel Only, and any other appropriate signs.

Laboratory Equipment.

1. Explosion-proof fume hood.
2. Goldfisch fat/oil extractor.
3. Analytical balance with ± 0.1 mg division size, with 10 gram NIST-class S weight.
4. Magnetic stirrer-hot plate.
5. Stirring bar (dia. 3 mm, L 12.7 mm).
6. Stir bar retriever (L 31 cm).
7. Beakers, glass, graduated, 250-ml capacity.
8. Cylinder, glass, graduated, 100-ml capacity.
9. Buret (either a KIMAX Class A automatic, precision bore, three-way stopcock with PTFE plug, 5-ml capacity; or a Brinkman Digital, 25-ml capacity).
10. Support stand.
11. Single-buret clamp.
12. Scoopula spatula.
13. Kimwipe tissues.

14. Crystallizing dish (dia. 190 mm, depth 100 mm).
15. Beaker brush.
16. Dust brush (for dusting balance).
17. Carboy with spigot; Nalgene Rectangular Polyethylene with Quick-Action Spigot; 5 gallon capacity.
18. Bulb-type safety pipet filler.
19. Pipet, Nalgene unbreakable, 10-ml capacity.
20. Filter; Whatman Qual. Grade Circles; Whatman 2 filter (15.0 cm).
21. Udy cyclone sample mill with 1 mm screen.
22. Vacuum cleaner.
23. Thermometer; - 20 degrees to + 110 degrees Celsius Scale.
24. Chemical storage cabinet.
25. Extraction Thimbles; Whatman Pure Cellulose Thimbles (22 mm x 80 mm).
26. Filling funnel; Nalgene polypropylene; (top dia. 65 mm, stem length 25 mm, stem dia. 15 mm).
27. Nalgene polypropylene wash bottle (500 ml).
28. Nonabsorbent cotton.

Chemicals. 1/

1. Petroleum ether 30 degrees - 60 degrees C. (ACS)

NOTE: After breaking a container's seal, store the container under forced ventilation (an activated fume hood). Store unopened containers in the chemical storage cabinet. Write the date that petroleum ether is received in the laboratory on each container. Petroleum ether that has been on hand over a year should be disposed of. Keep no more than 7 liters of petroleum ether on hand.

2. Sodium hydroxide (NaOH) solution 0.02 N.

NOTE: Replace NaOH solution with a fresh batch every 3 months.

3. 0.3 percent Phenolphthalein in ethanol.

1/ A Material Safety Data Sheet must be on hand for each chemical.

4. Alcohol, Reagent grade (specially denatured anhydrous ethyl alcohol).

Grinder Maintenance.

1. Clean grinders after every 20 samples are ground. To clean, unplug the grinder, then remove the lid and dust all parts, including the cover, impeller, grinding ring screen, separator, cyclone, and filter assembly. Dust all other accessible surfaces.
2. Replace the grinding ring and screen after approximately 8,000 samples have been ground. Always replace the grinding ring and screen at the same time.
3. Adjust the feed gate on the grinder to allow a flow rate of approximately 2 grams per second. The grinder motor should not be allowed to “drag,” or run at a reduced RPM when a sample is introduced. If motor drag occurs and cannot be eliminated by setting the feed rate properly or replacing the belts, service is required.
4. When one belt must be replaced, replace the other belt as well. Never replace only one of the two belts. After replacing the belts, make certain the round, plastic sleeve that houses the motor is positioned properly. The air vents at the base of the sleeve must be toward the back of the grinder; the air vents on the upper end encircle it.

(RESERVED)

TOTAL OIL AND FREE FATTY ACID WORKSHEET

Field Office:	Date:	Technician:		
Sample Number				
	100.0	100.0	100.0	100.0
% Moisture in Sample				
Moisture Conversion				
Weight of Ground Sample				
Weight of Beaker and Oil				
Weight of Beaker				
Weight of Oil				
	X 10	X 10	X 10	X 10
% Total Oil				
Moisture Conversion				
	X 100	X 100	X 100	X 100
% Total Oil, Moisture-Free Basis				
% Total Oil, Moisture-Free Basis (Rounded)				
Ending ml of NaOH				
Beginning ml of NaOH				
ml of OH				
Normality of NaOH				
	X 28.2	X 28.2	X 28.2	X 28.2
Weight of Oil				
% FFA in Oil				
% FFA in Oil (Rounded)				
% Total Oil, Moisture-Free Basis				
	÷ 100	÷ 100	÷ 100	÷ 100
% FFA in Sample				
% FFA in Sample (Rounded)				